SURA CHEMICALS

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The tension-free
adhesive

SurABond® 1414

ADHESIVE

Ideal for the tension-free adhesion between optical and optoelectronic components made of glass and quartz.

Product and application information

SurA Chemicals GmbH
Passion for Chemistry

SurABond® 1414

adhesive

The tension-free, RT-/thermal curing adhesive based on Silicone

Welcome to SurA Chemicals GmbH. The company has a long experience and an extensive know-how in the fields of protective and decorative coatings, adhesives, special chemicals such as hydrophobic agents and adhesion promoters, systems and equipment for surface pretreatment, as well as contract manufacturing for the development and production of customer specific products.

The focus of our technologies and innovative products is on the sectors of chemical industry, automotive, micro/-electronics, electrical engineering, healthcare, optics, glass & metal industry, plastics processing, printing and graphics industry, as also solar technology.

The company is TÜV certified according to DIN EN ISO 9001: 2015. Our products comply with the RoHS directive and are registered according to the REACH regulation. The devices manufactured in our house are CE-marked. Furthermore, we are partners in international and national research projects and cooperate with large companies and institutes from various countries. .

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RT-/thermal curing and tension-free

adhesive

SurABond® 1414

Compliant in accordance to

RoHS & REACH regulations

SurABond® 1414 is compliant according to the regulation (EG) No. 1907/2006 (REACH) and the EU directive 2011/65/EC (RoHS). SurA Chemicals is certified with DIN EN ISO 9001:2015.

This instruction guide will ensure the proper use of SurABond® 1414 adhesive and prevent eventual mistakes, which can lead to quality insufficiencies or adverse effects. It is of utmost importnace to ensure proper handling by processing, application, curing and storage of the SurACer® 1414 adhesive.

1. Introduction

SurABond® 1414 is a pourable two-part silicone rubber, which cures at RT or elevated temperatures by addition reaction. The highly flexible adhesive has a very low shrinkage and is excellent for bonding glass materials.

SurABond® 1414 is ideal for the tension-free adhesion between optical and optoelectronic components made of glass and quartz.

SurABond® 1414 is a low viscosity, pourable adhesive, being also absolutely suitable for use as a highly transparent potting compound for electronic components.

- flexible, transparent and tension-free
- low viscosity, high climate stability and very low shrinkage

Highly flexibel

and climate stable

2. Surface pretreatment

For best adhesion results, the substrates should be free of contamination and organic residues. Before gluing, the cleaning process can be carried out with suitable cleaning agents, such as alcohol, acetone, ethyl acetate or other relevant cleaners.

Caution! Some impurities (e.g. sulfur, amines and organometallic compounds) may inhibit the curing reaction. A prior small-scale test is recommended on the surfaces to be bonded, in order to check compatibility.

2.1 Surface SIlication (CCVD)

The pretreatment of surfaces by means of flame pyrolysis for the increase of adhesion on coatings, adhesives and printing media has been an established process in numerous industrial fields. A further significant improvement of the adhesive strength can be achieved by depositing a reactive silicate layer produced by flame pyrolysis. The combustion of a silane additive in a fuel gas atmosphere creates high-density and bonded silicate layers with high surface energy on a wide variety of material surfaces, such as metals, glass, ceramics and plastics.

Surface Silication

With the SurASil®-Process

By the SurASil® process, a gaseous, silicon-containing precursor is fed into the fuel gas mixture of a burner. The combustion energy of the flame creates highly reactive compounds that are deposited on the surface of the material. As a result, very dense and firmly bonded silicate layers (layer thickness approx. 20 - 100 nm) with high surface energy are formed on various material surfaces, such as metals, glass, ceramics, plastics and composite materials.

Combustion Chemical Vapour Deposition (CCVD) is a very effective and cost saving in-line procedure to enhance the wettability of surfaces by depositing highly reactive amorphous silicate layers (layer thickness approx. 20 - 100 nm). The surface silication is an environmentally friendly alternative to common harmful chromate coatings and primer applications!

The effect of the SurASil® pretreatment of surfaces is shown in figure 1. The surface energy of the pretreated surface (figure 1 - right) is much higher than that of the untreated surface (figure 1 - left). In this case the test-inks SurAChem® for qualitative testing of the surface energy have been used.

In combination with adhesion promoters with appropriate functionalities, this layer represents the basis for long-term, water- and solvent-stable adhesives, coatings and prints. Further applications of this technology are temporary corrosion protection as well as generation of diffusion barrier layers.

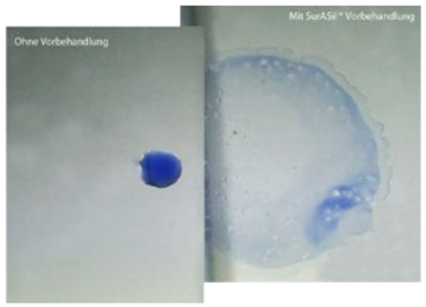


Figure1: The effect of surface silication and the surface energy on aluminum material

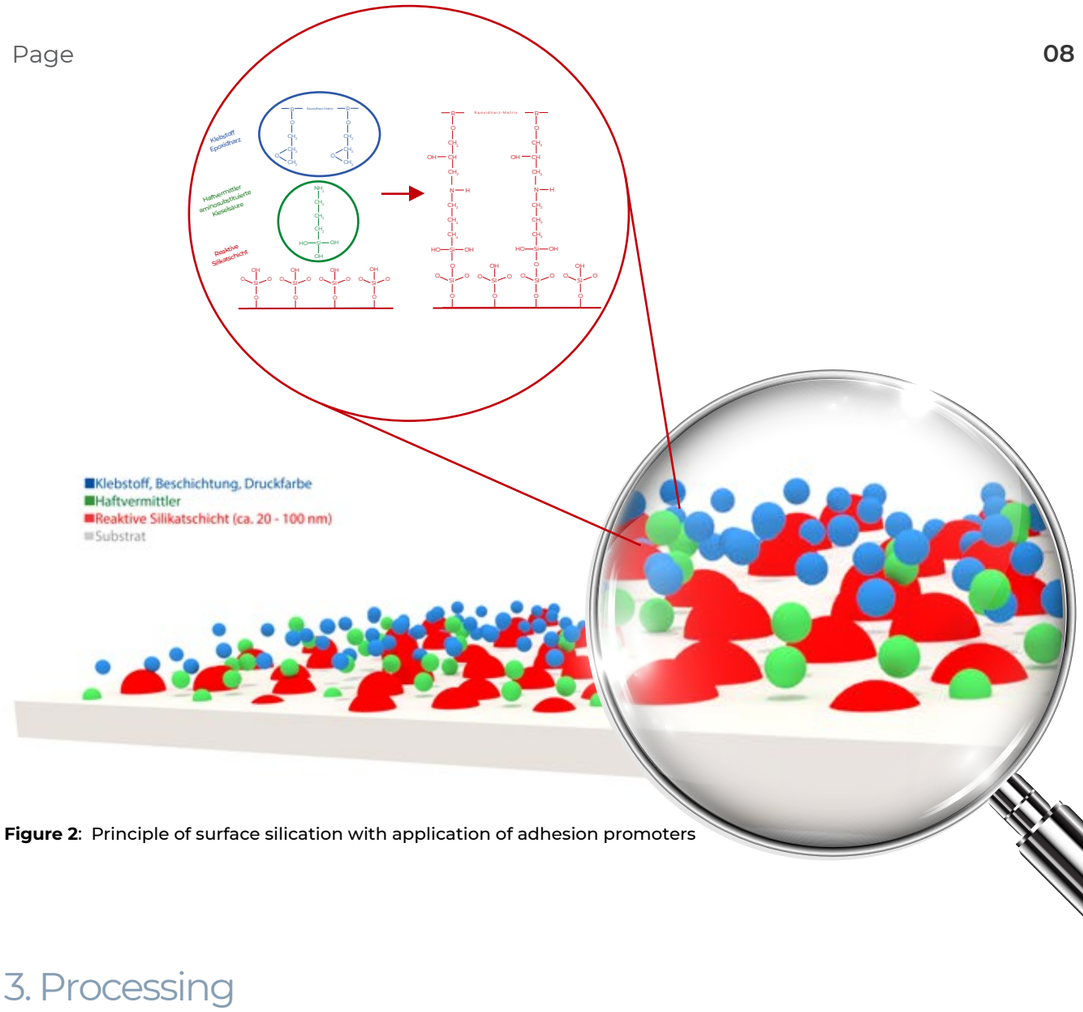


Figure 2: Principle of surface silication with application of adhesion promoters

3. Processing

The adhesive SurABond® 1414 can be immediately used after thoroughly mixing the two components resin : hardener = 9 : 1 (by weight). The mixture has a pot-life of ca. 90 mins at room temperature. The SurABond® 1414 adhesive can be thereafter applied manually or via appropriate dispensing devices.

For potting applications, so as to eliminate any air introduced during the mixing process or trapped under components, a vacuum encapsulation is recommended.

4. Curing

The curing process at room temperature (23°C) lasts ca. 24 hours. By increasing the temperature, the curing process can be accelerated, and the curing time can be reduced (see table 1).

Type	Description			
Curing temperature	23 °C	70 °C	100 °C	150 °C
Curing time	24 h	30 min.	8 min.	5 min.

Table 1: Curing time of SurABond® 1414

5. Packaging and storage

SurABond® 1414 adhesive is available in bottles, sizes starting from 25 g. SurABond® 1414 has a minimum shelf-life of 6 months after delivery, if stored unopened at +5 °C. In case of room-temperature storage, the product is stable for at least 3 months.

6. Technical data

Type	Description
Material:	tension-free adhesive and potting compound
System:	2-component silicone adhesve
Application field:	tension-free adhesive for optical components and opto-electronic parts made of glass or quartz, also uses as potting compound
Application method:	manually or by means of digital dispensers
Shrinkage:	< 2%
Density:	A: 0,97 g/cm³, B: 0,97 g/cm³, A+B: 0,97 g/cm³
Color:	crystal clear
Viscosity:	A: 1000 mPa·s, B: 200 mPa·s, A+B: 800 mPa·s
Mixing ratio:	9:1
Curing:	RT or thermal curing 23 °C: 24 Std., 70 °C: 30 Min., 100 °C: 8 Min., 150 °C: 5 Min.
Tensile strength:	~ 0,5 N/mm²
Elongation:	~ 500 %
Lap shear strength (based on DIN EN 1465)	
Glass-Glass:	~ 0,5 N/mm²
Aluminum-Aluminum:	~ 1,2 N/mm²
Steel-steel:	~ 0,7 N/mm²
Thermal resistance:	-50 °C to +180 °C

Type	Description
Hardness Shore A:	25
Dielectric strength:	23 kV/mm
Dielectric constant (Er):	2,7
Volume resistivity:	10^{15} Ω·cm
Tracking resistance (CTI):	> 600
Thermal conductivity:	0,2 W / (m·K)

Table 2: Characterization of SurABond® 1414

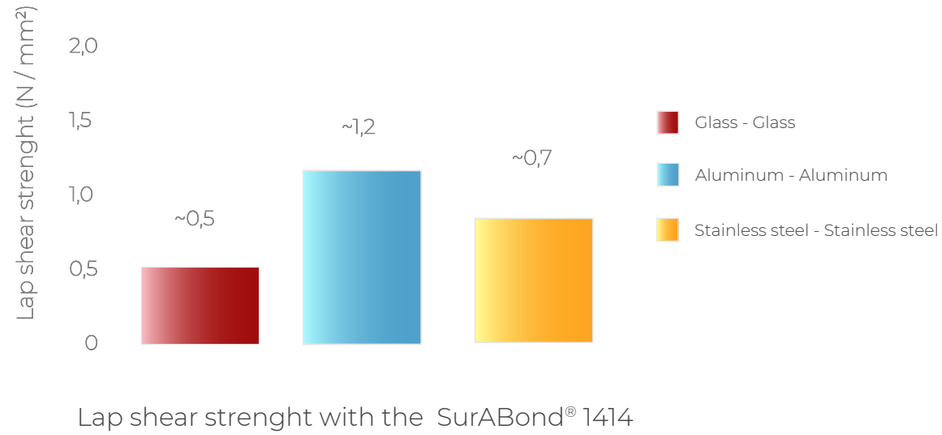
7. Performance tests

I. Lap shear strength based on DIN EN 1465

The adhesion of SurABond® 1414 was tested based on the Method DIN EN 1465. The substrates were cleaned and pretrearted via surface silication and adhesion promoters prior to gluing. The materials tested were glass, aluminum and stainless steel. The measured lap shear strength values depend on the substrate material glued, see graph 1:

II. Elasticity based on DIN 53504

S3A type test specimens were prepared from the pure adhesive material and their elongation was accordingly tested. The adhesive material showed a high elongation of 500 %:



Graph 1: Lap shear strenght with SurABond® 1414

8. Safety Information

Information regarding hazards, labeling, transport and disposal are given in the product-specific safety data sheets.

The technical consultation given by SurA Chemicals GmbH, verbally or written, is based on the company´s best knowledge and shall only be considered as non-binding advice, also in respect of the protected rights of third parties. The company´s technical consultation does not release the customer from own examination concerning the suitability and usability of the company´s product. The manufacturer's liability extends solely to the value of the products supplied by SurA Chemicals GmbH and applied by the customer.

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